

3 PAGE FLOATING POINT PACKAGE WITH FLOATING OUTPUT

DECUS Program Library Write-up

DECUS No. 8-375B

This write-up describes a 3 Page Floating Point Package whose distinguishing characteristic is that in 3 words it packs 27 bits.

The 3 word format is as follows:

WORD 1 SM EXCESS 200 EXPONENT MANTISSA
0 00000000 0.00

WORD 2 000000000000

WORD 3 000000000000

SM -SIGN OF MANTISSA. IF SM=1 then the # is
 CONSIDERED NEGATIVE; IF SM=0 then it is POSITIVE.
 The Mantissa is always in POSITIVE form, only the SIGN
 Bit indicates the sign. To negate a number, simply
 complement the sign bit.

Exponent - It is EXCESS 200, meaning the exponent is always
 200 + the true binary exponent. For example, 2,
 which in floating point binary is the following .10000 x
 2² is stored as follows in excess 200 format:

WORD 1: 2024 (SM=0.)

WORD 2: 0000

WORD 3: 0000

FLOATING INSTRUCTIONS

<u>INSTRUCTION</u>	<u>CODE</u>	<u>FUNCTION</u>	<u>TYPE</u>
FGET	0XXX	(FAC) <— (EA)	MRI
FADD	1XXX	(FAC) <— (FAC) + (EA)	MRI
FSUB	2XXX	(FAC) <— (FAC) - (EA)	MRI
FMUL	2XXX	(FAC) <— (FAC) x (EA)	MRI
FDIV	4XXX	(FAC) <— (FAC) ÷ (EA)	MRI
FJMP	5XXX	FPC <— (EA)	MRI
FPUT	7XXX	(EA) <— (FAC)	MRI

FEXT	0000	LEAVE INTERPRETOR
FNOR	6000	NORMALIZE FAC
FSKP	6600	SKIP NEXT INST
FSNE	6640	SKIP NEXT IF (FAC) \neq 0
FSEQ	6650	SKIP NEXT IF (FAC) = 0
FSGE	6700	SKIP NEXT IF (FAC) > 0
FSLT	6710	SKIP NEXT IF (FAC) < 0
FSGT	6640	SKIP NEXT IF (FAC) > 0
FSLE	6750	SKIP NEXT IF (FAC) < 0

NOTE:

FAC	-Floating AC
(FAC)	-Contents of Floating AC.
EA	-Effective Address
(EA)	-Contents of effective address
FPC	-Floating PC.

For core usage a listing should be referred to. In case of an error, the package HALTS. This can be fed by simply re-assigning the symbol ERROR to something more useful.

This package was written by Mark Bramhall, but arranged into a stand-alone package by Richard Rothman.

No floating I/O is contained in this package.

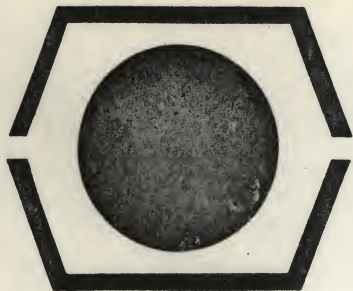
CORE USAGE	50 - 64, 5400 - 6177
ERROR LOCATION:	5525, 6046, 6064
	THESE CONTAIN HALTS. THEY CAN BE PATCHED TO SOMETHING ELSE OR REASSEMBLED

MEANING OF ERROR:	5525 - Exponent overflow
	6046 - Exponent underflow
	6064 - Division by 0.

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If this version is used, core usage, in addition to that mentioned above is: 6200-6377, 6400-6501, 6566-6577.

Floating point output is unformatted. Seven digits are typed. The seventh digit is rounded up from the 8th (which is not printed). Format of output is: $\pm X.XXXXXXE+XX$ or $\pm X.XXXXXXE-XX$. When calling this routine internally, the FAC should contain the #. A JMS is made to location 6200. On return the # has been typed (no CR's or LF's) and the FAC=0.



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DECUS NO.	8-375B
TITLE	3 PAGE FLOATING POINT PACKAGE WITH FLOATING OUTPUT
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COMPANY	Digital Equipment Corporation Maynard, Massachusetts
DATE	August 14, 1970
SOURCE LANGUAGE	PAL-10, VERSION 141

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